

4. RESEARCH DESIGN

INTRODUCTION

The Secretary of Interior's Standards and Guidelines (1983), the scope of work (NCDOT 1998b:3), and Data Recovery Plan (NCDOT 1998b) for the Neuse Levee site Phase III request a regional geological and cultural framework for the Neuse Levee project. The foregoing chapters have explored the environment, cultural history, and research ideas and methods commonly held in the Piedmont and adjacent regions. This chapter briefly reviews the background findings in an overview perspective, and attempts to formulate middle range concepts (Raab and Goodyear 1984) that link activities at the Neuse Levee site to the regional and Southeastern area concerns of the archaeological community. This design has been developed over several years of research in the Neuse Fall Line region, and is tailored in the following pages to support the guidelines in the NCDOT Data Recovery Plan.

The general research goals forwarded in the Data Recovery Plan are to:

- Determine the role of the site in the regional Archaic subsistence pattern. This was to be done with special reference to using the unusual Archaic floodplain deposits of the site to correct misinterpretations inherent in the archaeological literature because of the rarity of Archaic floodplain sites.
- Measure environmental changes as evidenced by the stratigraphic record of alluviation.

The first objective is set by NCDOT in the context of four key questions relating to Archaic site function, lithic-related activities, questions of mobility as it relates to lithic reduction techniques, and subsistence activities, especially with respect to seasonality.

These questions complement an ongoing research program for the Neuse Fall Line region developed during the Falls River (Lilly et al. 1995) and Wakefield Creek projects (Gunn et al. 1998) and Richland Creek (Hargrove 1998) sites. The methods and concepts of the Neuse Fall Line region research design were evolved from synthetic intersite studies in the North Carolina Piedmont by Davis (1987) and further elaborated by Gunn et al. (1998). The Wakefield Creek implementation of the design focused on the transition between the Archaic and the Woodland time periods, while the Richland Creek study sought to discover the relationships between small floodplains and Woodland sites.

These foci are also broadly appropriate for the Neuse Levee site, as its cultural deposits span the Late Archaic and Early Woodland periods as at Wakefield Creek. However, the presence of Late Woodland artifacts at Neuse Levee requires additional consideration of issues relating to that period, as on Richland Creek. The most appropriate concern for the Late Woodland would seem to be the transition to a more agriculturally based economy and the landscape ramifications of that era. This extended Neuse Fall Line region perspective is overlaid on the physiographic transition between the Neuse River floodplain sediment basin (see physiography in Chapter 2), within which the Neuse Levee site occurs, and the surrounding upland ridges (see review of archaeological sites in the Neuse Fall Line region in Chapter 3). Linking these conditions are various data classes, including lithics, ceramics, fire-cracked rock, carbon dates, botanical remains, and site sediment characteristics. From these relationships we attempt to reconstruct the land uses and site occupation customs of the past.

NEUSE FALL LINE REGION GEO-BIOPHYSICAL RESEARCH DESIGN

Most of the studies of archaeological sites in the North Carolina Piedmont and Inner Coastal Plain have focused on issues of chronology, lithic and ceramic technology, and geomorphology (Claggett and Cable 1982; Coe 1964; Davis 1987). Coe's work at the Doerschuk site established a tradition of sophisticated geomorphic study of sites to define a context for site formation processes.

More recently, interests have turned to seasonality of occupation (Byrd 1997; Gremillion 1993; Rogers 1993; Woodall 1991, 1996). Successes have been realized on the studies of more recent Late Woodland sites (Byrd 1997; Gremillion 1993). They have generally examined paleobotanical and faunal remains through carbonized plants and bone (Scarry and Scarry 1997). Other insights into past seasonality and mobility have been offered, including the idea that decreases in storage pits are linked to a more settled way of life (Gremillion 1993; Rogers 1993; Woodall 1991, 1996). This correlation is presumably because permanent residents of a site can store food in durable containers such as ceramics and are less in need of hiding their produce while attending as a group to other parts of their seasonal round.

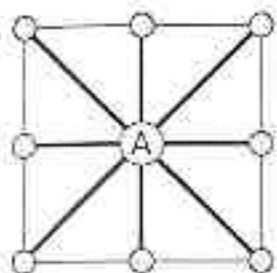
As outlined below, we attempt to use alternative methods to explore more remote time periods before the Late Woodland. No direct historical sources exist and the cultural and environmental terrain was potentially quite different from that of early history. An attempt was made in the Wakefield projects to consider chronology and seasonality, both theoretically and empirically. Landscape models engage the whole environmental context in the effort to interpret site use, frequently adding such insight to interpretation simply by infusing traditional analyses of fauna, flora, and techno-functional attributes of artifacts with topographic context. Site catchment analysis was an early example of such models, but landscapes are not limited to catchments. For the purposes of this study, the landscape is composed of the geology, hydrology, soils, and climate of the region. In such a landscape, topography assumes an important role because the Neuse Fall Line region involves several sites with diverse topographic characteristics, and the entire watershed is set in the topographically diverse fall line region. We have also explored fish behavior as riverine resources and large-game behavior as upland resources. We borrowed a model of Archaic to Woodland settlement pattern change from Mouer (1991), and observe the sources of external cultural influences that appear at the sites.

From States to Continua

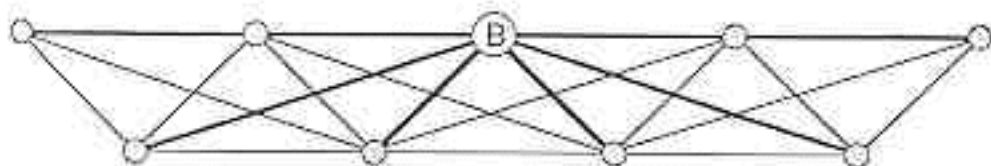
It is generally accepted that there were important changes in subsistence regimes between the Archaic and Woodland periods. The concept of shifts from upland to lowland orientation probably derives from Caldwell's (1958) subsistence intensification hypothesis. To our knowledge, this issue has been treated largely in terms of a switch between two states; basically people were either upland- or riverine-oriented.

Mouer (1991) developed an information theory-based model of the Archaic–Woodland change (Figure 4.1). It is expressed in terms of an Archaic communications net and a Woodland communications line. Archaic-period communications are conceived of as an open net extending more or less uniformly over upland and riverine environments. Within this net, archaeological sites form nodes near resources such as lithics, water, and food sources. Trails and watercourses are the communications channels between the nodes. Along these trails and watercourses, people moved to habitats according to the seasonal availability of resources at a node. Visits between groups were probably infrequent and calendrical. During those occasions, information was exchanged on the availability of resources, whereabouts of mates for young people, news of events in other parts of the net, and some trading of luxury goods with symbolic import.

During the Late Archaic this information scheme was refocused, with more emphasis placed along riverine habitats. The change was probably influenced in part by substantial environment dislocations between the Middle and Late Holocene, about 2500 B.C. (Gunn 1997). Crucial to our outlook on the

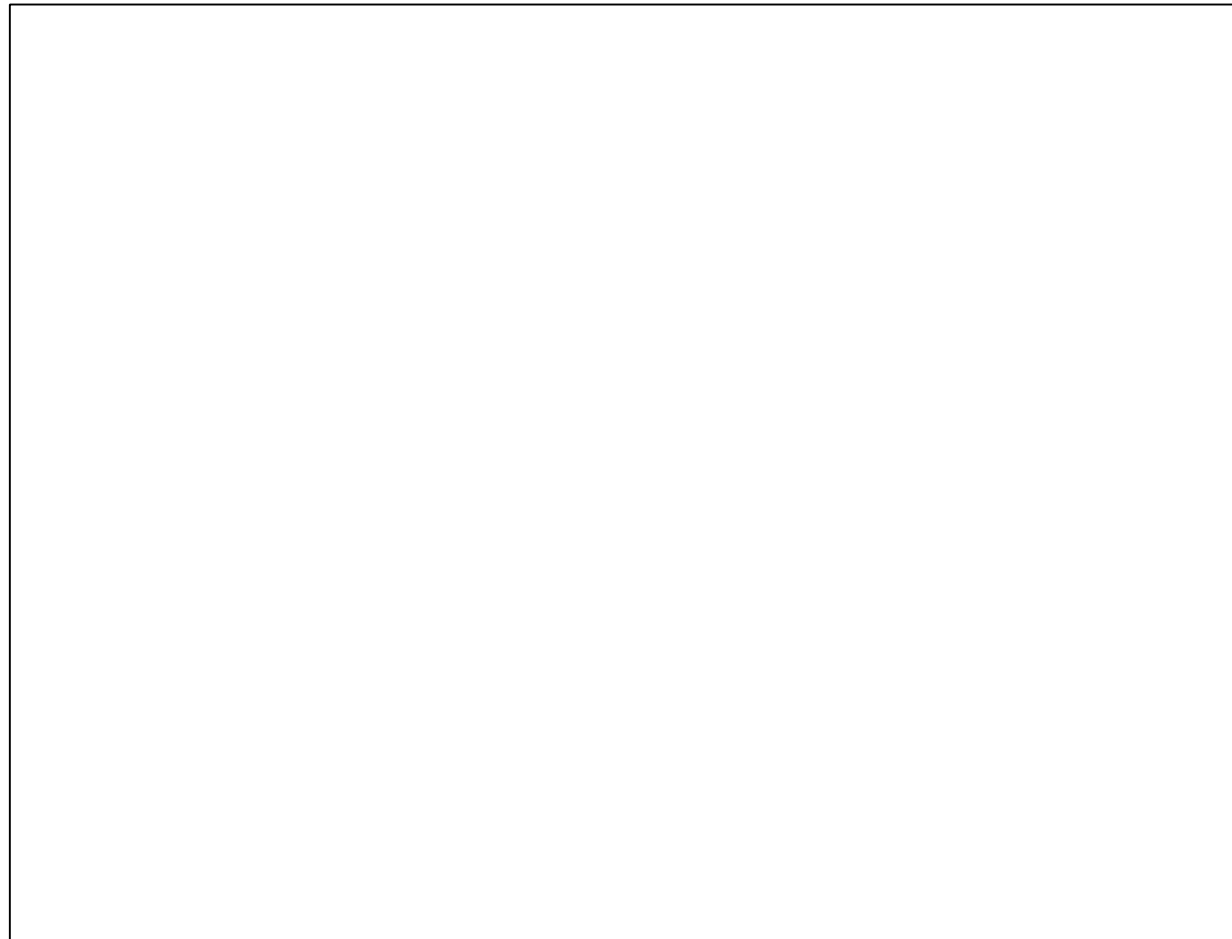


a: "Field" interaction model applicable to sylvan hunters and gatherers. The bold lines represent direct connections between "A" and eight nearest neighbors. Note that the interaction pattern forms a "cell" of neighbors, with no crossing lines.



b: "Chain" interaction model applicable to riverine hunters and gatherers. The bold lines represent connections between "B" and eight nearest neighbors. Note that lines of communication cross frequently, and that some of "B's" connections go through the territories of nearer neighbors.

Figure 4.1: Mauer's (1991) Archaic-Woodland Transition Information Model.



Coastal Plain/Piedmont transition zone, is the stabilization of sea level at about this time (Brooks et al. 1986; Brooks et al. 1989; Tanner 1993). This stabilization not only opened the huge estuaries of the Atlantic coast to reproduction and movement of anadromous fish, which depend on spacious estuaries to move from fresh to salt water, but also influenced floodplain depositional environments up to the Fall Line. Lower-level precipitation is also modulated by onshore winds blowing across warm shallows in the Coastal Zone; upon coming to uplifts, such as the Fall Line, orographic processes release the moisture gathered from coastal environments. Whatever other influences were involved, these enriched riverine habitats would have invited the attention of people who already spent some of their time in floodplain camp sites such as Neuse Levee, where Late Archaic Savannah River occupations are found. With the development of river fishing technology, and perhaps the co-utilization of floodplain sediments for horticulture of indigenous cultigens (Potter 1993; Smith 1989), much of the needs of substantial populations could be met.

In some regions researchers have observed that floodplain site location is constrained by the arable land to support a village (Potter 1993). This new, more constrained occupation pattern would have required a new set of communications rules. According to Mouer's model, it would have resembled a multiple-channel line following the floodplain's waterborne traffic. Under these circumstances, communications would have been more frequent, non-calendrical, and potentially volatile as disputes arose over resources, exchange networks were arranged and maintained, and resources of different regions shared. The transition from Early to Late Woodland would not have changed the overall design of the communications line system, but rather intensified it. An important question for this project, which is closely related to the Archaic-Woodland transition question, is: What were the ramifications of more

intensive utilization of floodplains for food production? This question applies to both the site role and environmental change objectives in the Data Recovery Plan (NCDOT 1998b:3) at a second temporal locus, the Early-(Middle)-Late Woodland transition. Exactly when the critical transitional issues engage is remains unclear.

In the Wakefield Creek study, thanks to the opportunity offered by a series of sites spanning floodplain to upland, we attempted to discover the links between upland mast-oriented activities and lowland riverine activities. It can be said with some assurance that the two aspects of subsistence are not mutually exclusive. Evidence is plentiful that the gathering of nuts and the extraction of nut oil continued into the early historic period. It is also clear from archaeology that riverine occupations played a significant role in Archaic settlement patterns at places such as the Doerschuk (Coe 1964) and Warren Wilson (Keel 1976) sites. In the five intensely studied sites in the Wakefield Creek study area, a pattern of Woodland ridgetop abandonment was evident. Similar patterns have been found in the Wadesboro/Pageland area further down the Fall Line (e.g., Gunn and Foss 1992; Gunn and Wilson 1993). Especially detailed are the Savannah River Site studies disseminated in several publications and summaries (e.g., Blanton and Sassaman 1989).

Stated succinctly, the Neuse Fall Line region perspective is concerned with not only upland and lowland occupations, but also what lies between. What are the processes and activities that were carried out in the interim areas between upland and lowland? What are the times of the shift from upland to lowland? What was the proportion of the shift relative to elevation? In short, the concerns are to change focus from two states, upland and floodplain, to continua, scales of activity between the floodplain-to-ridgetop topographic extremes. The riverside location of the Neuse Levee site affords an opportunity to evaluate riverside activities in the Archaic and Woodland periods.

The study of continua is implemented through usual analyses of lithic and ceramic technology and features, supplemented by analysis of extensive sediment samples by a multidisciplinary team. From these specialists come the residues of content and activity of humans stratum-by-stratum. By combining the cultural and environmental lines of evidence, we hope to extend understanding of the relationships between resource nodes in the Woodland communications regime. Presumably Neuse Levee was one of the communications net nodes in the Archaic and a line node in the Woodland. How did these changes of function affect the activities at the site?

Nut and Fish Oil + Plant Domestication

To gather information toward answering the questions posed below, and link the answers to Southeastern archaeologist's research topics, an extensive network of sediment samples was taken from Neuse Levee following methods developed at the three Wakefield Creek sites. It was hoped that new geochemical methods would provide information unavailable from more traditional analyses. Perhaps the most compelling reason for doing so was that some of the most important areas were not identifiable or were only marginally identifiable through traditional artifact analysis methods. The topographic location of the site suggests that it could have been associated with fishing. However, without some sort of definitive identification of fish residues, this could only remain an unsubstantiated inference.

The first effort to identify fish or other animal remains was the well-tested approach of analyzing sediments for phosphorus. Fish are particularly rich in phosphorus (Goffe 1980; Walker 1992). Samples were taken in vertical columns and a transect across the site to determine if there were enriched phosphorus areas near features such as rock discards or point concentrations (see geology discussion in Chapter 2).

A second line of effort examined sediment samples macro- and microscopically for biotic remains. Special samples were drawn from features; column samples were also taken to establish a linear sequence of site habitat changes.

During the Woodland period, Native Americans supplemented nut oil with fishing as an important means of food gathering. As is noted by Mouser (1991), the shift of food orientation probably had vast ramifications throughout society. Social organization could no longer revolve around a social net comfortably draped over the uplands and lowlands, but rather complex relationships had to evolve between villagers along river courses. This required a greatly enriched social network that telegraphed the intentions and desires of individuals and groups along the water courses and regularized their exchanges of goods and passages from place to place.

Also contemporary with the time span of the early Woodland Neuse Fall Line region sites is the development of indigenous domestic plants in the eastern woodlands (Smith 1989). The domestication process probably began with gourds at the time Morrow Mountain point users were occupying the Wakefield sites. During the Late Archaic several additional plants such as sunflower were domesticated. As the Early Woodland Eared Yadkin and Wakefield point users were along Wakefield Creek, a period of experimentation and secondary use of domesticated plants gave way to dominant reliance in some regions of the Midwest and Midsouth (Smith 1989). Smith believes, based on information available in 1989, that groups along the Gulf and Atlantic coasts continued to rely primarily on non-domesticated plants until much later. This could have been because anadromous fish and other indigenous resources were so rich that there was little incentive to change to a more labor-intensive scheme. Perhaps fishing and hunting were rich enough resources to preclude interest in domestication. At the same time that an important switch to indigenous domestic plants is documented in the Midwest between 250 B.C. and A.D. 200, at least one investigator believes Native Americans in North Carolina were the first in North America to use extensively the bow and arrow (Woodall 1996). However, residues of pipe tobacco have been recovered along the Fall Line in the first millennium A.D. (Oliver 1985). Does this suggest a selective use of domesticated plants? Other evidence of domestic plants has been found in the state, but, only chenopodium has been identified from before the Middle Woodland (Scarry and Scarry 1997:9). The specimens appeared in a Late Archaic context, but a species securely identified as domesticated does not appear until the Middle Woodland. The data generally seem to support Smith's hypothesis of no domesticates on the Atlantic Slope, but they are not conclusive; thus, it is important to observe rare Early Woodland sites closely for evidence of domestic plants, especially in highly occupied locations such as along the Fall Line, where supplementing wild food could have been important.

In our transect of sites from the Neuse River to the Neuse ridges, we suppose that the ridge would have always been a source of nut oil and the river always a source of fish oil and other fish products, possibly supplemented by horticulture of domesticated indigenous plants. The question in the cases of Wakefield Creek sites is how the transition was made from nut oil to fish oil. Was it abrupt, with only Red Hawk Run (31WA1376) providing fish products, or was there a gradual replacement from site to site up from the river to the ridge? The evidence seems to suggest that both nuts and fish were consumed in the Early Woodland. Surprisingly, hunting at the riparian edge might have been abandoned, or reduced in scope, or done in another way because of habitat change. The study of large game presented in the fauna section, taken with the reduced activity at 31WA1390, might suggest that the extensive burning of uplands observed by John Smith began in the middle of the first millennium B.C. and that somehow shifted the pattern of hunting. These are of course questions for studies broader and deeper in scope than this one. At the same time, because of its floodplain location on prime agricultural lands, the Congaree soil, what does Neuse Levee tell us about plant domestication along the North Carolina Fall Line?

Lithic Analysis Regime: Biface and Core Reduction Stages

The nut-fish oil hypothesis suggests that Woodland people not only exploited the lowlands, but also utilized the upland. Archaeologists ordinarily use sherds as signatures of domestic activity, but of all of the artifacts recovered in five upland sites at Wakefield Plantation, there was only one sherd. This raises the question of how to detect Woodland activity in the dominantly Archaic upland habitat. Points can also signal the presence of Woodland activity, but small triangular points are not related the collection of nut oil. If Potter's (1993) citations of ethnohistorical observations apply, expeditions to the uplands were

equipped and launched from riverside sites. Several researchers have made an effort to use the contrast between flake cores and biface cores to detect activity reaches. It is generally accepted (Glover 1998; Goodyear 1982) that biface cores are sometimes associated with more mobile societies and flake cores with more sedentary social organizations. The design suggested for this site sequence was to test the ratio of core flakes to biface flakes to determine if there were changes over time (see below for methods). For heuristic purposes his model assumes that Archaic people are habitually or preferentially biface flakers (mobile), and the Woodland people, core flakers (sedentary). Obviously, the bifacing technology was not lost to Woodland artisans, as they also made points and used bifaces. Thus, it must be recognized that bifacing could also reflect Woodland activities. Were collecting sorties to the uplands preferentially equipped with bifacing technology because of the mobility it affords? Would the core-biface flakes ratios in Neuse Levee reflect the dominance of either upland or lowland gathering? The multicomponent levels at Neuse Levee provide an excellent opportunity to examine this question.

With its vast store of lithic debris one might jump to the conclusion that the Neuse Levee site is an exceptional place to study the mobility–technology problem. However, a great proportion of the flakes are core flakes by virtue of the quarry character of the site. Most flakes should be core flakes because splitting and initial working of a stone require the production of characteristic core flakes. Thus, the question is not entirely straightforward. Perhaps the proportions of core to biface flakes could be compared from component to component, except that evidence has emerged that something, perhaps silting of the river bottom at about the beginning of Late Woodland, reduced availability of local cores and lithic material was imported to the area from upstream (see geology discussion in Chapter 2 and lithics analysis Chapter 10).

How does one account for the unusual string of sites along the narrow floodplain of Wakefield Creek, and what bearing does this have on Neuse Levee? Would the richer resources at the Fall Line and Falls of the Neuse be pertinent? More generally, why do populations at resource-rich locations tend to occupy a wider range of habitats? This allows a view of both Fall Lines and coastal zone through the same lens. At locations with dense population aggregates, such as falls, along the Piedmont fall line, or at heads of estuaries in the Coastal Zone (which is well documented in the tidewater area of Chesapeake Bay), people are more likely to organize field parties to exploit uplands even though their primary settlements and focused on lowlands (Potter 1993; Steponaitis 1986). The reason for this might be that resource-rich zones are better able to afford expeditions to nearby uplands in both material and people, or that population overshoot is more likely to require exploitation of extended vertical ranges. A third possibility is an issue of taste vs. calories; that is, if one is in a habitat of plenty, one can afford to resort to select food items from the environment, and even sample a wider range of resources in nearby habitats; but if one is in a less bountiful environment, issues drift more toward obtaining sufficient calories to survive. This idea suggests that groups far from resource-rich aggregates are more likely to focus on the dominant subsistence mode of their time, floodplain farming and fishing in the Woodland and mast and hunting in the Archaic, because it provides the most reliable produce and uses and maintains the greatest amount of cultural skill. Thus, away from the opportune places such as fall lines and estuaries, Archaic culture would have been concentrated in the uplands, and Woodland in the lowlands. In the ecotonal transition zones, each expanded to the alternative habitat, thus explaining an Archaic deposit at Neuse Levee.

Lithics and Activities

At the Wakefield Creek sites point breakage and flake reduction stages were studied to determine the type of activity being undertaken. Point tips, for example, are of no apparent value when broken from the rest of the point and haft (see Figure 5.3, and below for methods of observation). Possibly they were broken in difficult work circumstances, such as butchering large animals or woodwork. Medial fragments imply extended difficult work with no time taken to resharpen the broken tip. Bases represent an entirely different setting in which the time and materials for rehafting are present. The refurbishing activity is most likely to be undertaken in the comfort of a base camp, probably while other time-consuming tasks are transpiring.

Similarly, the stage of lithic reduction also reflects the temporal circumstance. Large, secondary flakes of exotic material imply leisurely preparation of tools from raw materials brought in from a distance. Primary flakes should appear in quarry circumstances, where time is being taken to remove unusable parts of a core before transporting it. Tertiary flakes indicate the final stage of reduction, in which tools are being finely shaped, resharpened, or reshaped after damage. Such activities will probably follow decisions about intended activities and tool use.

In yet another perspective, Brown (1998) has suggested that the larger a flake is the more likely it is to be redeposited by cleaning or other processes that are likely to change the original location of debitage. Smaller flakes are more likely to remain in place because they will be missed in the cleaning or moving process. Some of the flakes in the Archaic levels at Neuse Levee are very large and very concentrated. Whether there are reconcentrations of lithics in different squares, suggesting movement of large flakes, can be tested using a fractal equation that describes the usual size distribution of flakes.

FCR Analysis Regime: Functional Area Identification

Concentrations of rock are key indicators of prehistoric human occupation, especially in depositional environments where rocks of certain sizes (usually larger), would not be anticipated (White 1980). Fire-cracked rock (FCR) was analyzed on a piece-by-piece basis to determine minimum usable size, preferred material and configuration, and density parameters (see below for methods). Pieces of FCR that have been recycled and re-cracked until they are below some threshold must be unduly troublesome to heat and handle for food preparation. A previous study found that threshold to be about 5 cm or less (Gunn and Wilson 1993). Like point tips, we assume that FCR fragments that fall below the threshold were abandoned in place and therefore serve as a better marker of FCR-related activity than large pieces, which could have been removed from their location and recycled to more or other uses.

Ceramic Analysis Regime

Apart from their presence as domestic containers, it was assumed that ceramics contain other hints as to their function and disposition. Only sherds were found. Analysis of sherds requires assumptions that render the sherd a tractable analytical unit (Lilly and Gunn 1996). How, for example, can the attributes of a plug (a sherd) randomly selected from anywhere on a vessel be made to stand for the vessel as a whole? Are there other aspects of community life that a plug might represent, either as an individual specimen or in a statistical population? For example, it has been suggested that temper size was preselected in anticipation of the size of the pot (Braun 1982:184; Bronitsky and Hamer 1986:97, 98; Steponaitis 1983:43–45). A correlation between temper size and site coordinates could indicate that different-sized pots were used in different parts of the site. A correlation between temper size and level depth could indicate that site function was changed over time requiring adjustments in the size of vessels.

In addition to temper size, other attributes were collected following Davis (1987). Davis' model was followed in the hope that the ceramic data set from the Neuse Fall Line region could be analyzed in conjunction with Davis' efforts to identify ethnic boundaries and sociological features of pottery distributions in the Piedmont.

Perhaps the most curious aspect of ceramics in the Piedmont is their great continuity of design despite inherent drawbacks. Yadkin ceramics are generally tempered with quartz sand or crushed quartz, which expands during firing and would seem to threaten the integrity of a vessel during firing. Yadkin ceramics appear in the first millennium B.C. and essentially continue until European contact. The Porter Site (Idol 1997; Rogers 1993; Woodall 1998) is a Late Woodland single-component site at the confluence of the Yadkin and Roaring rivers. It is at the boundary between the Mississippian Lamar people of the mountains and the Late Woodland of the lower Yadkin River. The site dates to around A.D. 1500. Mixing of the two cultures is apparent in ceramics. Steatite-tempered ceramics comprise the greater part

of the assemblage (70%) reflecting the presence of the Lamar-influenced elite in the village. Even so, sherds with crushed quartz, comprise the remaining 30%. They reflect the tastes of their downstream relatives where villages remain wholly dedicated to the old Yadkin ceramics. To quote Woodall (1998:5), they “remained doggedly committed to an old and conservative mode of ceramic manufacture, and burials and households show scant evidence of even incipient social ranking.”

The question posed by this continuity is not so much why there is continuity of ceramic production lasting over 2000 years, but why this continuity would exist when many other groups in the Southeast had experimented with alternative tempers at least since the Middle Woodland. Virtually all of them were favorable to higher firing temperatures because of their lower thermal coefficients (grog, shell, and steatite). Some had experimented with moss and marl since the beginning of ceramics 4000 years earlier. Even in the shadow of Mississippian sedentism, and while farming more productive, imported tropical domesticates such as maize, the people of the Yadkin maintained at least part of their tradition of semisedentary seasonal movements to resources (Rogers 1993). This custom involved burying the produce of gardens and forest in pits, often in pots; large numbers of so-called pot busts have been found.

Building on this model, the manufacture of ceramics at low firing temperatures might have taken place at food collecting stations. Low firing would have been less time-consuming and labor-intensive, affording pots that could have been employed for limited use at reasonable labor cost. As such they could either have become part of the site furniture, perhaps for on-site storage, or firing in place would have saved one-way transportation of empty vessels. This site furniture hypothesis is appealing because it would account for the presence of sherds at sites that otherwise seem inappropriate for long-term occupation, especially those on the narrow Wakefield Creek floodplain, but is perhaps less satisfactory for Neuse Levee. Neuse Levee might be considered a reasonable location for a village under some circumstances, such as during fishing season. Before the construction of the US 401 bridge, the confluence of the Neuse River with its unnamed tributary might have had a rather extensive slackwater deposit; would it have been large enough to provide arable land and thus attract horticulturists? Breakage during firing in place could also be an important factor in sherd generation. All of the sherds observed in the Wakefield Creek sites were fired under virtually identical conditions, perhaps again arguing for nearby manufacture rather than importation from varied external manufacturing environments. The Neuse Levee ceramic assemblage was very different from the Wakefield sites in many respects. Even so, it reflects the persistence of the sand- and grit-tempered ceramics of the area.

The Question of External Influences and Internal Continuity

The cultural histories of both ceramics and lithics raise questions about the origins of their technologies at different times in the past. Various authors have seen both external influences on (Coe 1964) and internal continuity (Keel 1976) in North Carolina's indigenous, prehistoric populations. There are several possibilities: population continuity from the beginning, outside influences on indigenous populations without population replacement, or total population replacement. There is evidence of outside influences such as Mississippian moving northward from Georgia to visit Town Creek, Lamar spreading down from the Appalachian Summit to the upper Yadkin and Catawba watersheds, and Algonkian skeletal features appearing along the coast. Outside influences cannot be dismissed, but this is the normal state of cultures: every culture is the center of some kind of transition.

In an era when alternatives are the watchword of science, internal continuity and external influences probably both have to be assumed; only the proportions remain to be determined. However, despite interest in problem, the literature does not provide definitive information about the internal continuity of regional technology. Some cultural items appear to have originated in the state. For example, the earliest dates on the Late Archaic Savannah River points come from the North Carolina Blue Ridge front, at the Warren Wilson site near Asheville. Although the bow and arrow could have been known since at least 4,000 years ago, arguments have been forwarded that it found its earliest widespread application in the North Carolina Piedmont. These findings, either accepted or under debate, leave the question open.

What local technology did North Carolina Native Americans keep during the last 2,000 years? During this time the Native American landscape of North America was awash with changes in domestication of plants, ceramic technology, ritual behavior, and many other domains of human endeavor. Before examining this question directly, some contextual observations are in order.

Clearly North Carolina was an exceptionally rich environment in the early historic period; as discussed in the environment Chapter 2, the area has the highest biodiversity in North America. Birds, mammals, plants, and fish all provided unusually plentiful resources (Tippitt and Moss 1996). In the fall and spring pigeons passed through the area in great numbers. In the early spring, a time of hardship for most hunters and gatherers, anadromous fish swarmed up the rivers. Fish weirs reportedly dotted the river channels and produced prolific catches. They could well have been a key feature of the regional Native American economy. The areas around the state known for large early historic populations were the most elevated reaches of rivers that could support the passage of large numbers of anadromous fish. The Catawbas moved from their first known homeland in the Charlotte area across the state to the fishing reaches of the Dan River in southern Virginia (Wetmore 1975). After encountering unfriendly Iroquois from New York there, they returned to the Catawba River, and then moved over the middle of the state again to join the Tuscarora on the northeast Coastal Plain.

In the center of this triangle of Catawba passage, Native American groups were observed in the early eighteenth century. Lawson found villages at Hillsborough and nearby on the Eno River, a tributary of the Neuse River (Lefler 1967). At least one of these villages, Occaneechi Town at Hillsborough, seem to have been related to a path crossing the state along present-day I-85 from Fort Henry (present-day Petersburg), Virginia, a British colonial trading center. There is some question as to whether this path existed before European trade goods (Briceland 1987; Myer 1971). In Myer's map of paths across the state, the Fall Line and Coastal Plain are otherwise remarkable for their lack of known traveled paths. According to Lawson, the area around the Fall Line and east was used as Tuscarora hunting grounds (Lefler 1967).

All of this suggests the possibility of substantial fluctuations in prehistoric populations, which would imply accompanying profound changes in ceramic and lithic technology. Perhaps one of the most important functions a review of the evidence of cultural change from the Neuse Fall Line region can bring is a better understand the apparent juxtaposition of continuity and change.

Dimensions of Neuse Fall Line Prehistoric Past

The quantities described above, taken as a multivariate whole, describe a number of potential dimensions of variability in time in the lifeways of people who visited the sites of the Neuse Fall Line watershed. The next chapter describes the content of the Neuse Levee site relative to these dimensions. Subsequent chapters undertake fine-grained investigations of the dimensions: soil residues (including botanical remains), lithics, ceramics, and FCR. When synthesized with the ecological implications of the Neuse watershed topography, they provide the fabric of an argument of considerable resolution on human activities between about 5500 B.C. and A.D. 1500.

RESEARCH DOMAINS AND QUESTIONS

As directed by the Secretary of Interior's (1983) Standards and Guidelines, archaeological excavations are guided by research designs that pertain to the regional history. The research design for the 31WA1137 data recovery investigations was developed by NCDOT staff, and was briefly reviewed at the beginning of the chapter.

Further background research of regional literature was conducted, including Claggett and Cable's (1982) study at Falls Lake, Hargrove's (1991) research at Little River Reservoir, and other recent studies (Cantley and Raymer 1990; Glover 1993; Gunn and Lilly 1997; Gunn et al. 1997; Hargrove 1986, 1987; Lilly and Gunn 1995; Maher 1992a, 1992b). These sources were examined in the previous chapter. Numerous other sources were also consulted, and are referenced in the following discussion. In addition, a number of individuals familiar with the archaeology and environment of the Piedmont and Inner Coastal Plain regions of North Carolina and surrounding regions were interviewed.

Several research questions were suggested in the foregoing middle-level modeling efforts, literature reviews, and research design exercises. In the following discussion the questions derived from these issues are discussed and grouped according to research domains.

The Neuse Levee site seems to be a small occupation confined to the crest of a levee. It could represent short-term, task-specific occupations. It is generally thought that such sites were satellite occupations to larger, more permanent sites. In most areas of the Atlantic Slope, larger semipermanent sites were probably located on the floodplains in the Woodland periods and on ridgetops overlooking the valleys during the Archaic periods. Understanding the distribution and use patterns of such satellite sites and their relationships to larger permanent or semipermanent occupations, such as seasonal camps or base camps, is necessary for the complete evaluation of prehistoric settlement systems. The substantial survey work in the area seems not to have revealed such large sites as are fairly common in the Piedmont, such as the Frederick site (Dickens et al. 1987) or the Wilson site (H. Millis 1998) a few miles to the east in the Coastal Plain. It has been observed in Virginia that the narrow floodplains common to the Fall Line region do not provide sufficient areas of arable land, which might explain the lack of semipermanent sites (Potter 1993).

The Neuse Levee site has been demonstrated by dating and diagnostics to contain features, artifacts, and subsistence remains relating to at least four periods:

- Late Archaic
- Early Woodland
- Middle Woodland
- Late Woodland

Consequently, the site was thought to have the potential to provide data relevant to a wide array of research issues, ranging from narrowly focused questions concerning the material culture and technology of specific components, to synthetic questions about changing settlement and subsistence patterns. In order to structure this almost infinite variety of research topics, six major research domains were defined:

- Chronology
- Environmental Reconstruction and Resource Availability
- Material Culture
- Subsistence
- Component Seasonality, Function, and Settlement Plan
- Social Organization and Inter-Regional Relationships

Below, numerous research questions are presented in sets according to these six general research domains. Each set of questions begins with a statement formulating the boundaries and significance of the domain. This is followed first by the general or synthetic questions relating to that topic, and then by more specific questions. Although these questions are numerous, they are not exhaustive. As was suspected before the project began, the data did not allow all of these research questions to be addressed with equal focus, but each was addressed as far as possible. As is summarized in the conclusions chapter, the research at Neuse Levee substantially augmented our understanding of the nature of the site, its relationship to the immediate surroundings in the upper Neuse River region, and relationship to sites elsewhere in Wake County and adjacent regions.

Chronology

Establishing a fine-grained chronology for the human occupation of 31WA1137 was essential to understanding the cultural history of the site and was a prerequisite to addressing subsequent research domains and questions. “Fine-grained” here means sub-period (i.e., of lesser duration than Late Archaic, Early Woodland) time resolution. Developing a chronology begins by determining the time span of the occupations represented at each site, which was accomplished through a combination of absolute and relative dating of feature contents, occupation floors, and temporally diagnostic artifacts. These techniques provided a fine-grained analysis of environmental and cultural changes during each occupation, through which the following questions could be addressed.

What is the chronology of the human occupation of 31WA1137? To what degree can radiocarbon and OCR dates, coupled with artifact analyses, provide more refined intervals for the various prehistoric occupations? Using these techniques, can features and artifacts be placed in fine-grained chronological sequence within components? What time spans are represented by stratigraphic gaps, either sterile levels or truncated strata, in the sites?

Is there evidence for occupations prior to the Late Archaic period? Are there lapses of occupation between the Late Archaic and Early Woodland period occupations, as have been suggested at other sites in the region?

What processes appear to be responsible for abandonment and reoccupation of the site? What is the timing of abandonment? Are archaeological signatures of this abandonment and resettlement identifiable elsewhere in the region?

What are the chronological relationships among the Woodland period ceramic types at 31WA1137 and the sites on Richland and Wakefield Creeks? Do these materials represent a single occupation at the site, or are two or more Woodland occupations represented?

Do the so-called crude Guilford projectile points represent a distinct but undefined point type or another type of tool? How does this tool or type relate to existing typologies for the Mid-Atlantic and Southeastern regions? How does this compare chronologically with other point types generally assigned to the Early Woodland period in the Piedmont region (e.g., Yadkin and Gypsy point types)?

Environmental Reconstruction and Resource Availability

A reconstruction of the site’s environment throughout the various periods of occupation provided essential information concerning inhabitants’ relationships to the landscape. This reconstruction considered of the regional paleoenvironmental data, as well as human impacts on the immediate site environment (see below for relevant methods). The following research questions have been developed concerning the environmental history of 31WA1137.

What are the depositional history and fluvial chronology at the site? How does the fluvial sequence relate to the broader chronology of Wakefield and Richland creeks? How do these alluvial chronologies relate to other floodplain sequences in the Southeast, especially with reference to the contrasting sets of rivers originating in the mountains and the Piedmont (see Gunn and Foss 1992)?

What do flood recurrence data suggest about prehistoric occupation of the area? Are flood recurrence intervals frequent or infrequent? Can associations be made between highest and lowest annual stream discharge rates and seasonality of occupation? Was the site most likely to be occupied during late summer and early fall, when it was less likely to be inundated by flooding because of increased evapotranspiration and decreased precipitation? How does tropical storm frequency in summer and fall affect flood frequency? Can these tendencies be projected into the past using tree rings, fluvial chronology, and other paleoenvironmental indicators?

What are the sedimentation rates at 31WA1137 and how do they relate to extant paleoecological data? Are there periods of fluctuation or are the rates constant through the different temporal periods? Do these data suggest stream aggradation, or do they indicate periods of stream incising and channel entrenchment, particularly during the Late Archaic (see Stevens 1991:196), which would have resulted in a lower water table and exposure of new floodplain and terrace surfaces?

What forest and grassland types were present in the immediate vicinity of 31WA1137 prior to and during the various occupations? Is there evidence for change in vegetation communities in relation to documented changes in global climate (e.g., Gunn 1994c:16–18) over these periods? What effects did climatic conditions at the three sites have on resource availability? Is there evidence of intentional landscape modification at these sites?

Do phytoliths or sediment data provide evidence for deforestation during periods of intense occupation? Is it possible to document progressive changes in the local environment during and between individual episodes of site occupation, and, if so, how do those changes appear to be related to episodes of site abandonment and reoccupation?

What natural resources (clay, stone, etc.) are present in the immediate vicinity of the site?

Material Culture

A number of general and specific research questions relate to the material culture (ceramics, stone tools, etc.) associated with each of the site components. Due to the interrelationships between material culture and other aspects of human adaptations, many of these questions also relate to questions of chronology, subsistence, and site organization. Others are more focused on the biological environment, but are important in gathering a broad picture of prehistoric Native American lifeways at the site.

What ceramic vessel forms are present in the Woodland period components? What information do vessel forms and direct evidence of use (sooting, pitting, erosion, etc.) provide concerning subsistence and cooking practices (Hally 1986; Rice 1987)? How do changing vessel forms over time appear to relate to changing settlement or subsistence practices? How do these vessels compare with contemporary vessel assemblages documented elsewhere in the Piedmont and Coastal Plain and adjacent regions (e.g., Blanton et al. 1986:96–99; Coe 1964; Herbert and Mathis 1996; Sassaman et al. 1993:127–151)?

Is vessel form diversity reduced in comparison with other assemblages? Do the ceramic types present relate to a single series/tradition, successive series, or contemporaneous series? Is there evidence for a trend toward decreased vessel wall thickness from Early through Late Woodland period, as suggested by studies elsewhere (e.g., Sassaman et al. 1993:141), or is there an increase in wall thickness as documented in the North Carolina Piedmont (Woodall 1996)? If present, how does this trend relate to changes in

subsistence practices? Do vessel forms change in relative frequency from bowls to jars, as previously suggested for the Piedmont (Woodall 1996)?

How do the frequencies of various ceramic decorative motifs compare with those documented elsewhere (Cantley and Raymer 1990; Claggett et al. 1978; Davis 1987; Gunn et al. 1998; Hargrove 1991)?

What lithic tool forms are present in the assemblages? What patterns of raw material procurement and reduction are evident for each of the components, and how are these similar to, or different from, other documented lithic assemblages in the region?

Is there variety in the activities represented at the site? Does the site represent long-term occupations or short-term, recurrent occupations? Are early through late stages of tool manufacture represented in the artifact assemblage?

Is a pattern of lithic raw material preference indicated by functional or stylistic categories of artifacts? Do raw material preferences vary by component or activity event? What raw materials are represented in the lithic assemblage and what information do they provide about participation in trade and exchange networks, seasonal movements, raw material preference, etc.? Does the preference of raw material relate to duration and intensity of occupation? Was the granite/rhyolite from the site from the river or from other areas? What relationship does this have with bipolar versus bifacial reduction techniques?

What is the function of the FCR at 31WA1137? Is it related to intensive processing of food resources, specifically fish?

Subsistence

Investigation of subsistence practices in the transitional zone between the Coastal Plain and Piedmont is one of the goals of the data recovery investigations. This goal includes an attempt to recognize specific foods and determine their importance, as well as to examine the overall pattern of changing foodways and their effects on the prehistoric populations and the local environment. Previous excavations during Phase II found no intact features within the strata. Cultural features can contribute both quantitative and qualitative data on subsistence practices and exploitation of other seasonally available resources.

What is the nature of subsistence-related activities at 31WA1137? What evidence is there for changing subsistence practices? How do those practices relate to changes in material culture?

Is there evidence of gathering and/or domestication of plant foods? Is there indication of intentional landscape modification, such as that involved with pioneering grain and edible seed plants like goosefoot and knotweed or domesticated plants?

Were starchy seed plants cultivated? How do the subsistence practices evident at the site compare with those from the surrounding region (Cantley and Raymer 1990; Gremillion 1987; Holm 1987; Ward and Davis 1993)?

What role did hunting play in subsistence? Can a focused adaptation be discerned from the subsistence remains, the preferred adaptive strategy observed elsewhere during the Late Archaic and Woodland periods (Mouer 1990, 1991; Stevens 1991; Yarnell and Black 1985), or is a diffuse adaptation implied?

Phelps (1983) notes that small streamside sites in the Early Woodland and Wakefield Creek site 31WA1390 seem to have been abandoned or refocused in function during the Early Woodland. Does this trend reflect a general realignment or abandonment of hunting locations, perhaps associated with the riparian-to-valley wall edge, during this period? The topographic locations of Phelps's sites needs to be investigated. Can the Neuse Levee Phase III excavations shed further light on this line of research?

What is the role of fish, specifically anadromous fish, in the diet of the inhabitants? Is there evidence of exploitation of anadromous species, such as shad, herring, alewife, and striped bass? Can fishing be related to climatic variation through the physical hydrology of the Falls of the Neuse? Does 31WA1137 provide an optimal location for harvesting anadromous fish? How does 31WA1137 compare with the settings of sites associated with anadromous fish exploitation (heads of tributary streams, shallow river channels, and at the Fall Line), as noted elsewhere in the Mid-Atlantic region (Mouer 1990)? How do these sites compare with Early Woodland assemblages above the Fall Line, which may have focused exclusively on forest resources?

Component Seasonality, Function, and Settlement Pattern

A fifth group of research questions combines data on chronology, material culture, and subsistence to examine the nature of the components represented at 31WA1137 and at other sites in the Neuse Fall Line region. In this regard, it is essential to note that sites represent overlapping components of varying type and duration. Therefore, each site represents a composite of site types. Each component with its different human and environmental circumstances can be expected to represent a different set of activities. The delineation of components needs to be established before functional interpretations of a site can be made, because an accurate assessment of factors influencing archaeological formation processes is important in evaluating the archaeological record of a site (Schiffer 1987). Determination of settlement function is usually based on artifact variety. Disturbance of stratigraphy can lead to vertical or horizontal mixing of artifacts; consequently, reuse of the site for different functions, in combination with overlapping of potentially unrelated artifacts and activities, can lead to incorrect interpretations of site function (Binford 1982). Evidence of the changing component-to-component use of 31WA1137 through time could provide considerable insight into changing patterns of human adaptation in North Carolina. Insight will be substantially extended when 31WA1137 component functions are cross-correlated with other site components in the Neuse Fall Line region.

Are different types of features associated with different areas, artifact types, etc.? Is there functional variation of feature types and artifacts at any of these sites? What are the form and function of Archaic and Woodland features?

Are the Archaic and Woodland deposits at 31WA1137 horizontally distinct? Is this horizontal stratigraphy correlated with a concomitant build-up of the landform?

Does spatial patterning within the site provide information regarding the site's structure and function? What distribution characteristics are present for activity and possibly habitation areas and features? Is the site organized spatially into discrete patterns of features and artifacts?

What inferences can be made concerning technomic functions and spatial distribution of artifacts and artifact classes to identify activities? What information can the inferred range of activities provide about the possible functions of the site?

What activities were carried out during the occupation episodes? What was the seasonality and duration of these episodes? How do these sites fit into regional settlement patterns at different times in their history?

If terminal Paleoindian or Archaic period occupations can be distinguished at 31WA1137, are they short- or long-term occupations? Do the artifacts and features from those occupations provide insight into the ranges of activities? Do the occupations appear to represent groups organized into patterns of logistical or residential mobility (Binford 1980)?

Are the Late Archaic/Early Woodland occupations base camps or short-term, task-specific occupations indicative of extractive camps? Are there temporary or permanent structures associated with these occupations? Is there variability among structure types?

Social Organization and Inter-Regional Relationships

The final research domain and research questions relate to broader concerns of social organization and inter-regional interaction. In most cases, these questions use information from more specific research questions outlined above.

How does 31WA1137 relate to 31WA1398 on Richland Creek, 31WA1376, 31WA1380, and 31WA1390 on Wakefield Creek, and the sites in Davis' (1987) Piedmont data set? How does it relate to other sites in similar settings in the Neuse and Little River valleys? Do the sites clarify our understanding of local and regional settlement patterns in the region?

What information do material culture patterns (e.g., the relative frequency of ceramic motifs, diachronic changes in lithic raw material use) and evidence of settlement structure provide concerning patterns of group affiliation, mobility, and exchange?

How are lithic acquisition and usage tied to patterns of social interaction and environmental adaptation?

How do patterns of material culture use, subsistence, feature form, and settlement organization compare to other occupations in the area?